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What Is Malnutrition?

Hundreds of thousands of American children are undernourished

By
LYDIA ROBERTS

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Children's Year Follow-up Series No. 1 Bureau Publication No. 59

U. S. Department of Labor
Children's Bureau

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DEPARTMENT OF LABOR
UNITED STATES OF AMERICA

WHAT IS MALNUTRITION?

Malnutrition in children has at last begun to receive the attention it deserves. Articles concerning it are appearing in medical journals, popular magazines, and newspapers; and a variety of agencies are being set at work to combat it.

It is important that information on this subject should reach parents, teachers, social workers, and all others responsible for the welfare of children. In order to insure this, it has seemed worth while to summarize in bulletin form the most important facts concerning the nature, extent, causes, effects, and treatment of this condition.

SIGNS AND SYMPTOMS OF MALNUTRITION.

The first question which naturally arises is: What is malnutrition? Is it an infectious disease like measles or whooping cough which runs its course and then is over? Unfortunately not, otherwise steps would long ago have been taken to control it. Neither is it a disease like gout or rheumatism which causes sufficient pain to demand attention and treatment. It is, in fact, not a disease at all, but, as Dr. George Newman, chief medical officer of the board of education (England and Wales), ①[1] well expresses it, "a low condition of health and body substance. It is measurable not only by height, weight, and robustness, but by many other signs and symptoms." A description of these "signs and symptoms" found in the undernourished child will furnish a better idea of the meaning of the term than can any attempt at formal definition. The picture will be even clearer if its opposite—a healthy, well-nourished child—be first described.

A well-nourished child, first of all, measures up to racial and family standards of his age in height and weight. He has good color, bright eyes—no blue or dark circles underneath them—and smooth, glossy hair. His carriage is good, his step elastic, his flesh firm, and his muscles well-developed. In disposition he is usually happy and good-natured; he is brim full of life and animal spirits and is constantly active both physically and mentally. His sleep is sound, his appetite and digestion good, his bowels regular. He is, in short, what nature meant him to be before anything else—a happy, healthy young animal.

A malnourished child lacks several or all of these characteristics of a normal child, depending on the degree of undernutrition. He is

[1] The circled figures used throughout refer to corresponding figures in the list of references found on pp. 19 to 20.

usually thin, but may be fat and flabby instead. His skin may have a pale, delicate, waxlike look, or be sallow, muddy, even pasty or "earthy" in appearance. There are usually dark hollows or blue circles underneath his eyes, and the mucous membrane inside his eyelids and in his mouth is often pale and colorless. His hair may be rough—like that often seen in poorly cared for farm animals—his tongue coated, and his bowels constipated. His skin seems loose, his flesh is flabby, and his muscles are undeveloped. Because of the lack of a muscular tone, his shoulders are usually rounded, sometimes protruding to such an extent as to make the deformity known as "wings"; his chest is flat and narrow. Decayed teeth, adenoids, enlarged or diseased tonsils may also be present. ②

The animal spirits natural to all healthy young are apt to be lacking in the undernourished child. He may be listless in play and work, will probably tire easily, not care to romp and play like other children, and will often be regarded as lazy. There is likely to be a lack of mental vigor also. Little power of concentration and attention, and absence of a child's natural inquisitiveness and mental alertness are his common characteristics. The expression of his eyes and of the entire face is often lifeless and dull. In disposition, he may be extremely irritable and difficult to manage, and he is often abnormally afraid of strangers. He may be nervous, restless, fidgety, and will probably sleep lightly and be "finicky" about his food.

Such, then, are some of the "signs and symptoms" which may distinguish a malnourished child from a well-nourished one. It is easy to see that malnutrition is a relative term. There are all degrees of undernutrition—from severe cases exhibiting practically every symptom described above, to the ones which, though they seem to lack definite symptoms, still give the general impression of not being just normal. In actual practice, however, children are called malnourished only when one or more of the various symptoms have become quite marked, particularly underweight for height and flabbiness of flesh and muscles. Since underweight is an almost certain result of faulty nutrition, it has become the custom of many physicians to class children as malnourished by this one symptom alone. Dr. Emerson, who was one of the first to direct our attention to the treatment of undernourished children, has called any child malnourished who is habitually 10 per cent underweight for height. ③ In a very recent study he is using 7 per cent as the standard. ④ Dr. Holt considers 10 per cent underweight for height from 6 to 10 years and 12 per cent from 11 to 16 years indications of undernutrition. ⑤ He believes the *annual rate of increase* in weight and height, however, to be even more important. ⑤ ⑥ Any child, therefore, who is markedly underweight for his height or who does not gain at the normal rate can be safely put into the malnourished group. Other

defects will usually confirm the decision. Dr. Emerson finds an average of five physical defects in a malnourished child to one in a well-nourished one.

There can be no question that children 10 per cent below normal weight for their height should be classed as malnourished, for, as Dr. Emerson says, "Children do not become underweight to this degree except for adequate causes." ③ The only question is, Should we stop there? In New York City, at least, there are 60 to 70 children out of every hundred—as figures given later will show—who are not underweight to the extent of 10 per cent, but who are, nevertheless, below par in one or more respects. Inquiry into the living habits of these children almost always reveals a faulty diet or otherwise defective health program. That they are not underweight may be due to good feeding during infancy or unusually resistant bodies; for it often takes considerable time before the results of bad living show themselves in loss of weight, anemia, and other definite symptoms. It would be worse than folly, surely, to wait for a loss of weight to tell us that such children are being undernourished. Would it not be wise, in fact, to regard them as malnourished in a less degree and consider them safe only when they are known to be on a suitable diet and living a normal child's life? These are the ones whom a little influence for good or bad would easily push up into the excellent group or down into the malnourished one. Now is the time to see that they get pushed in the right direction. Is it too high a standard to say that we aim to put all children in the excellent group?

EXTENT OF MALNUTRITION.

Knowing the character of malnutrition, the question immediately follows: What is the extent of this condition? Are there any considerable numbers of malnourished children in our own and other countries? And is their number decreasing or increasing?

In France, Belgium, and other countries of the war zone the question can have but one answer. In spite of stupendous efforts to protect the young the shortage of food and other conditions of war have had disastrous effects on the health of the children. No statistics are needed to show that the number of undernourished children in these countries is appallingly large.

In England the condition is less serious, though grave enough to demand attention. Dr. Newman in his 1915 and 1917 reports ① ⑦ concludes that fully 10 per cent of the school children are malnourished. So large a number is a matter of grave concern. Compared with the numbers for previous years, however, the figures show that in spite of the war, the number of seriously under-

nourished children has actually decreased. On the other hand, the number of children in the best nutritive condition as opposed to fair has also diminished. Medical officers attribute the decrease of marked malnutrition to the higher wages which have made the purchase of an adequate diet possible. ⑧ The decrease in good nutrition they believe is explained by the anxiety of mothers to fall in with the voluntary rationing of the food controller. Speaking generally, however, the consensus of opinion among English medical officers is that the children of their schools are, on the whole, in a better-nourished condition than they were before the war. ⑨

In our own country the figures are not so gratifying. ⑩ We have no method of obtaining data for the whole country as has England, so results of certain typical investigations are our only guides. One of the most recent investigations ⑪ was made in March, 1918, by the bureau of child hygiene of New York City. Of 171,661 school children from the borough of Manhattan who were examined, the following results were obtained: Grade I (excellent), 17.3 per cent; Grade II (passable), 61.1 per cent; Grade III (poor), 18.5 per cent; Grade IV (very poor), 3.1 per cent.

A number of scales for grading physical examinations of children have been devised and used. The Dunfermline scale, ⑫ ⑬ originated by Dr. McKenzie, of Dunfermline, Scotland, was adopted by the bureau of child hygiene of New York City a few years back and is the one now used generally throughout the country. This scale divides children into four classes:

I. Excellent.—The state of nutrition of a child of superior healthy condition. (The perfect, well-nourished child described above.)

II. Passable.—Children falling just short of excellent. (Sometimes called fair, or good, or normal.)

III. Poor.—Children requiring supervision.

IV. Very poor.—Children requiring medical attention.

The ones falling into Classes III and IV are usually considered as cases of malnutrition.

The value of this scale lies in the fact that it makes grading easy, because in Groups III and IV it names something definite to be done to a child, and in Group I it explicitly states that a child so graded is not merely excellent compared with others of a group, but is one who would be considered excellent anywhere. In making the classification, other factors than weight are, of course, considered. The general appearance of the child, the condition of the skin and subcutaneous tissue, the muscular tone and development, the state of the mucous membrane, the vigor or listlessness which may appear in the child's facial expression, carriage, movements, voice, interest, and attention, all contribute to the decision.

Even with such a grading system, however, in which the classes are fairly well defined, it could not be expected that any two examiners would necessarily classify a given group of children exactly the same. So long as the work is done by human beings, the personal equation will enter in. And yet in a test application of this scale in New York City it was found that physicians agree on the state of nutrition as well as, or better than, they do on even such common defects as tonsils and bad teeth. The use of the scale has been criticized,

however, and it must be admitted that the grades are apt to signify very different things, depending on the examiner. It was found in New York City, for instance, that physicians in certain sections had become so accustomed to malnutrition that they had come to regard it as a racial or local type, and since they found no children belonging in Group I they had used the scale merely to show *degrees* of malnutrition. The fact that such grading may occur hardly seems sufficient ground for abolishing the scale entirely, for it certainly serves a purpose. It would instead seem wiser to make sure that all examining physicians are actually familiar with the physically superior type; that they know the scale, the requirements for the different grades, and understand fully that the standards are to be applied as absolute not relative ones. Other classifications are sometimes used, as good, fair, poor, or a five-grade scale of excellent, good, fair, poor, and very poor. It matters little what scale is used, however, if the standards for each grade are well defined and these standards strictly adhered to in the grading. The advisability of grading all children instead of disregarding all but the markedly underweight ones is evident.

The bureau of child hygiene believed that these figures could be safely assumed as applicable to the city as a whole. This being so, New York's 1,000,000 school children would be distributed about as follows: Normal as regards nutrition, 173,000; passable, 611,000; seriously undernourished, 216,000. According to Dr. Josephine Baker, ⑭ this last number is a decided increase over those for previous years. She gives the proportion of malnourished school children as 5 per cent in 1914, 6 per cent in 1915, 12 per cent in 1916, and 21 per cent in 1917. With such conditions revealed—with over 200,000 malnourished children in their schools, and with the number rapidly increasing—is it any wonder that New York physicians and child welfare agencies have become aroused to the fact that it behooves them to do something about it?

These figures are for New York City. To what extent they are applicable to the country at large we can only surmise; but we can safely conclude that the estimate so frequently made that 10 per cent of the children in our country are suffering from malnutrition is far too low. The estimate given by Dr. Wood ⑮ that between 15 and 25 per cent of our school children (3,000,000 to 5,000,000) are undernourished is probably much nearer the truth.

CAUSES OF MALNUTRITION.

The most important question to consider in regard to malnutrition is, What causes it? Why are so few children in the excellent group? Why are so many distinctly malnourished and a still larger number much below par? Are a certain few "predestined" to be physically fit and others doomed by inheritance to be inferior to a greater or less degree?

It is easy to blame heredity, and there can be no question that poor inheritance may handicap a child's development. Physicians are

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generally agreed, however, that it is, after all, responsible for but a very minor part of malnutrition. The majority of children are born healthy. Given this start, with proper surroundings and nurture, they should develop normally into healthy, well-nourished children. That this happens in so few cases is definite proof that there is something wrong with the health program, resulting in faulty health habits. ④ Failure to provide a child with any one or more of the necessary conditions for normal growth may result in malnutrition. The most important causes of this condition may, therefore, be readily given.

SPECIFIC CAUSES.

Diet.—Insufficient or unsuitable food and drink, such as tea and coffee instead of milk, is generally conceded to be the chief cause of undernutrition. The first requirement of a growing child is food. Every movement his body makes, every bit of work it does, requires energy, and this energy must be furnished by the food he eats. If the food supply is insufficient, the body itself is burned to provide the energy, and loss of weight results. It is essential, therefore, that the diet of a growing child should be, first of all, generous in amount. An insufficient and inadequate breakfast of bread and coffee, whether or not the midday meal is adequate, practically always means too little total food, even though a hearty supper may be eaten. Indulgence in sweets and highly seasoned foods, habitual eating between meals, late hours, unventilated sleeping rooms, and lack of exercise may all result in a "finicky" appetite and thus in the taking of too little food. Whenever the food eaten habitually falls below the actual need, no matter for what reason, malnutrition is the unfailing consequence.

A diet inadequate in the kind of food has equally disastrous results. To be well nourished, a child must have every day some body-building material, or protein, to help form his muscles, his blood, his heart, his lungs, his brain, and all other living parts of the body. Without it his muscles can not develop normally nor his organs be in the best condition. Certain proteins of animal origin—those of milk, eggs, and meat—are more valuable for growth than are those of cereals, beans, peas, and vegetables. A liberal amount of the child's "building material," therefore, should be furnished by foods of animal origin. Failure to supply these in sufficient amounts may result in undernourishment.

Another specific need of the child's body is for minerals. He must have plenty of lime to build sound bones and teeth, iron to make red blood, and other minerals for just as definite uses. Without suitable amounts of lime and phosphorus, his bones will surely be spongy and his teeth defective, while a lack of iron causes anemia. In this

condition the blood has not enough normal red corpuscles to carry sufficient oxygen to the tissues to burn the food, and loss of weight follows. Since milk is about the only liberal source of lime, and since vegetables, fruits, whole cereals, and egg yolks, in addition to milk, supply most of the other minerals, it is readily seen that many cases of malnutrition are caused by too little of one or more of these foods.

In addition to proteins and minerals, a child's diet must contain some of the growth-regulating substances commonly known as "vitamines." One, called water soluble B by Dr. McCollum, ⑯ is found abundantly in vegetables, fruits, milk, and all natural foodstuffs. Another (fat soluble A) ⑯ is less widely distributed. It is found in liberal amounts in the fat of milk, egg yolks, and glandular organs, and in the leaves of plants. There is little danger that an ordinary diet, unless made up of too purified foodstuffs, will be lacking in the first; but it is quite possible that many children who have no leafy vegetables and practically no milk or eggs may fail to grow normally because of an insufficient amount of the fat soluble vitamine. Without fairly liberal amounts of milk, leafy vegetables, and eggs, therefore, the diet can hardly fail to be lacking in minerals, growth proteins, and the necessary vitamines. Malnutrition of many children may be laid to the fact that they receive too little of one or more of these necessary foods.

Indigestible foods and faulty habits of eating may also help to cause undernutrition. We have unquestionably gone a long way when we have provided a diet for a child which is ample in amount and adequate in quality. In ideal feeding, however, the suitability of the food, the hours of eating, and all other food habits must be considered also. It must be remembered that the child's digestive tract is far from being fully developed and should not, therefore, be expected to take care of all foods suitable for adult use any more than an immature body can be expected to do the work of a man. It is important to all his future life that his organs be not overtaxed nor his digestive system weakened while he is young. To insure this demands the provision of simple, well-cooked, easily digested foods; the exclusion of all rich, highly seasoned, indigestible ones; the introduction of new foods only gradually; and regular, unhurried meals, with no indiscriminate eating between meals. Failure to take account of these factors may cause indigestion and weakened powers of digestion and assimilation. If the body is unable to use the food provided, malnutrition is as certain as if the diet were inadequate in amount. (For further material on children's food, see Child Care, pages 11–30; Milk, the Indispensable Food for Children; and Feeding the Child, Dodger No. 8, published by the Children's Bureau.)

Sleep.—Insufficient sleep and other faulty health habits are also responsible for malnutrition. Experiments with undernourished children have shown that even after the diet has been regulated

children do not gain properly unless the hours of sleep are also sufficient and regular. Teachers and others dealing with large groups of children testify to the fact that children of early age who should be in bed not later than 7 or 8 o'clock are retiring at 9, 10, 11, or even later. The sleep problem surely needs attacking as well as the food problem.

Fatigue.—The importance of rest, both mental and physical, as part of the treatment of undernourishment is plainly demonstrated by classroom work in the schools. Certain children will not gain until removed from school or allowed only a half-day session. Rest periods of one-half to one hour are found necessary to guard against overfatigue in these chidren. Complete physical relaxation by lying down on the back for even 15 minutes will give better results than a longer time of partial rest. These rest periods should be taken preferably before the midmorning lunch and the evening meal, and are most effective when combined with the open window.

In addition to too little sleep and fatigue, lack of fresh outdoor air and exercise, constipation, unhealthful living conditions, and undue excitement may also be contributing factors to malnutrition.

Defect and disease.—Enlarged and diseased tonsils, adenoids, decayed teeth, tuberculosis, and syphilis are also causes of undernutrition. Adenoids and enlarged tonsils may act in two ways. They obstruct the free passage of air to the lungs, thus limiting the oxidation of food in the tissues, just as closing the draft to a stove keeps the fire from burning. Then, too, these abnormal growths are apt to become diseased, when either their toxins may circulate through the body and prevent the building up of tissue or even destroy it, or secondary seats of focal infection may arise from germs from these diseased areas being carried by the blood to distant parts of the body. It is not strange, therefore, that severe cases of malnutrition are sometimes cured by merely removing these growths.

Bad teeth, of course, may be the result of undernutrition, but they may in turn help to cause it. They may become sources of infection similar to tonsils and adenoids and thus in the same way cause tissue destruction.

Probably the most active agent in tearing down the body, once it attacks it, is tuberculosis. It not only gradually destroys the organ which is infected, but its toxins, like the ones already mentioned, are so pernicious that only the strongest, most robust body can withstand them. It will be seen later that all these factors—diseased tonsils, adenoids, decayed teeth, and tuberculosis—may be results as well as causes of malnutrition. When these physical defects are present they become even more important than food or sleep in causing undernutrition. No matter how much wholesome food a child eats, if he has not enough oxygen to burn it, or if the body is being torn down as fast as it can be built up, there is little chance for him even to hold his own, much less to gain.

Children who are victims of congenital syphilis usually exhibit marked malnutrition. The nutrition problem, in fact, may appear as the most serious feature in such cases and persist unhelped until specific medication is used.

UNDERLYING CAUSES.

Poverty.—Before we attempt to correct malnutrition, however, it is necessary to go still further back and inquire into the underlying causes of the specific ones. Why are children insufficiently fed? Why do they have too little sleep? Why are bad teeth and tonsils not attended to? The answer seems to be that poverty, ignorance, and lack of parental control, singly or together, are the responsible factors. Not long ago it was customary to lay practically all the blame on poverty. Recently, however, there is a tendency—because of the discovery of the importance of the other two factors—to disregard it somewhat as a cause of malnutrition. Either extreme, of course, is wrong. An intelligent woman can undoubtedly come much nearer providing an adequate diet for her family on a limited income than can an ignorant woman with the same money—she may even succeed where the other fails—but the fact remains that there is a certain minimum income below which not all the intelligence in the world can purchase an adequate diet. It must be remembered, too. that it is poverty in a host of cases which is the real cause of ignorance. Had these poorer people the means, would they not in fact move into a better part of town, live in better houses, and purchase a better diet merely because of the natural desire for more and varied foods? And would they not naturally come into contact with influences which would to a certain extent educate them? Indeed, if we desire proof that this is so, we need but recall the fact that in England, even in the midst of war, with mothers away from home working and the children more or less neglected, the per cent of markedly malnourished children decreased rather than increased, as it was feared and expected would be the case. This decrease, as before mentioned, is attributed by English authorities to the high wages which made it possible for families to have better and more abundant food and more desirable living conditions.

Although we have come to know that poverty is not the only underlying cause of malnutrition, we must not forget after all that the first big step toward removing large numbers of children from the ranks of the undernourished would be to insure their parents an income considerably above the mere subsistence level.

Ignorance and lack of parental control.—Abundant proofs that ignorance and lack of parental control are in many cases even more important factors than poverty are not wanting. Studies of home conditions have shown that children are insufficiently fed because

parents are ignorant of what are proper foods, of how to spend their money to get the best return in food value, of the necessity of regular, unhurried meals, of the need of a good breakfast for a growing child, of the harmfulness of tea and coffee and the habit of eating candy and trash between meals. Ignorance, as well as poverty, is to blame for much of the unhygienic living; and the same can be said of lack of attention given to teeth and to physical defects. Removal of this parental ignorance without any change in the financial condition whatever will, in a host of cases, be sufficient to effect the desired improvement in the child's nutrition.

Even when poverty is not a factor and when ignorance does not exist or has been removed, there still remain many children who are undernourished merely for the lack of wise parental control. Even when they know better, a large number of parents allow their children to eat what and when they like, to live under continual stimulation and excitement, and to choose their own time for going to bed. Truly it has become in this respect to far too great an extent the "age of the child."

EFFECTS OF MALNUTRITION.

Why worry about malnourished children? Many of them manage to keep alive, to pass through school, and grow up to take their places in the world as men and women. Does it make any difference, then, if they are undernourished now? It does, indeed, make a great difference. "Malnutrition," ⑦ says the chief medical officer of England after many years of observation of its effects, "is one of the gravest evils of its [the child's] physique. The malnourished child tends to become disabled, and unemployable, incapable of resisting disease or withstanding its onset and process." Its evil effects, as we shall see, are shown both in the physical and mental development of the child.

PHYSICAL EFFECTS.

Stunted growth, anemia, nervousness, irritability, and diminished energy have already been shown to be accompaniments of malnutrition. From the standpoint of comfortable living alone, these are important. A nervous, restless, irritable child or adult is a constant drain on the life of all his associates, and a lifeless, uninterested one is no joy to himself nor to anyone else.

The results of diminished energy, however, are even more far-reaching. The listless, inactive, malnourished child who is constantly tired, who leans against the schoolhouse while his comrades play, is father to the man who is handicapped because of low vitality and a poorly developed body, and hence unable to do his full share of the world's work. He is the inefficient adult, the rejected army

recruit. A proof of this was shown at the time of the Boer War, when England was shocked to learn that three out of every five men who applied for service were physically unfit. The commission appointed to inquire into the reason returned the verdict that malnutrition of children was one of the most serious causes. In our own country at the beginning of the recent war practically the same situation was repeated. Startlingly large numbers of applicants had to be rejected because of physical unfitness, and again the consensus of opinion blamed malnutrition and remediable defects of infancy and early childhood.

One of the most serious results of malnutrition is shown in increased susceptibility and lack of resistance to disease. Let an infectious disease, such as measles, whooping cough, or scarlet fever, attack a neighborhood and the difference between the well-nourished and the malnourished child at once appears. The child in fine physical condition may not escape the disease; but if he does contract it, he has more vigor to withstand the attack and his recovery is usually rapid. The undernourished child, on the other hand, especially if he has bad teeth, diseased tonsils, or adenoids, usually "takes" the disease, probably has a more serious case, and recovers with greater difficulty, if at all. A large proportion of mortality among children is due directly or indirectly to faulty nutrition. Scarlet fever, diphtheria, measles, pneumonia, tuberculosis, and intestinal diseases claim most of their victims from those who have not sufficient stamina to resist them.

The relation between malnutrition and tuberculosis needs special emphasis. We have seen that tuberculosis may be an active cause of malnutrition, and we now find that a malnourished body is the best soil for tuberculosis. It is a vicious circle. Malnutrition makes the child susceptible to tuberculosis, which, once started, tears down the body and increases the degree of undernutrition. This in turn makes the progress of the disease still easier, and thus the process continues until the end. The only possible way to withstand tuberculosis, once infection has occurred, is to build up so fine and well-nourished a body that the disease can make no headway.

If mothers could be taught to regard undernutrition as an abnormal condition, likely to result at any time in serious illness and possible death, they could be more easily persuaded to strain every effort to bring their children up to normal, and they would cease to take pride, as do many mothers even yet, in having a "delicate" child.

MENTAL EFFECTS.

The effect of nutrition on mental development has long been recognized. There has, indeed, been shown to be a close relation between malnutrition and backwardness in school. Experiments in school feeding, both here and abroad, have shown that an improvement in the nutrition of a child is in practically all cases accompanied by

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mental improvement also. Teachers testify that the children are easier to teach, have greater power of concentration and attention, and are able to do better work, as is shown by their school grades. This is not difficult to understand, for a starved brain can not be expected to work efficiently any more than can a starved body. It is not surprising, therefore, to find considerable retardation in malnourished children.

Dr. Tredgold, ⑰ one of the leading authorities on mental deficiency, tells us that in some cases this retardation due to malnutrition may be so extreme as to make it almost impossible to distinguish it from actual mental defect. That it is not so is shown by the rapidity with which the child becomes mentally normal when the adverse factors causing the subnormal physical condition are removed. Dr. Tredgold believes it possible, however, for malnutrition to be so severe and prolonged that a degree of actual mental deficiency of secondary form may be produced. Such cases he admits are very uncommon, but, since he has had a number of cases in which no other cause could be assigned, he holds to the opinion that they may occur.

It is thus seen to be imperative from the standpoint of the mental as well as the physical welfare of the race that every means should be used to make and keep the rising generation physically sound and well nourished.

TREATMENT OF MALNUTRITION.

The first step in the treatment of malnutrition is to find the cause. This means a careful inquiry into the child's whole method of living, as well as a thorough standardized physical examination. ⑱ The cause discovered, the next step, obviously, is to remove it. Sometimes this is a comparatively simple matter, and again the child's whole program of life needs to be thoroughly overhauled. Tonsils and adenoids may need to be taken out, bad teeth cared for, the diet regulated, and a new scheme of living instituted. If poverty is a determining factor, the help of relief agencies must be enlisted; ignorance of the requirements of adequate food and healthful living must be replaced by knowledge; and parents urged to exercise a wiser, firmer control of their children's way of living. To do all these requires a program of health education and sometimes even the provision of opportunities for securing proper food and living in the fresh air. Some of the agencies which have been established to meet these needs are discussed in the following sections.

SCHOOL LUNCHES. ⑲

School lunches were established in England almost immediately following the discovery in 1900 of the extent of malnutrition in that country (discussed on p. 13), and have been extensively used there. During the year 1914–15, a maximum number of 29,560,316 meals

were served by the educational authorities. [20] These lunches are of the extra meal type, sometimes being a breakfast, sometimes a midmorning lunch, and again only a cup of milk. They minister largely, though not entirely, to the children of the poor, and their use is based on the belief that insufficient food is the chief cause of poor nutrition. The results of school feeding in England have been so beneficial to the children in every way that the school lunch as a specific measure for dealing with malnutrition has become a firmly established institution.

The American school lunch is of two types. One, like the English, is the midmorning lunch, meant to supplement the scanty breakfasts which so large a number of children have, and to provide extra nourishment which often seems to be necessary in order to cause underweight children to make proper gains. New York, Philadelphia, Chicago, and other cities have started lunches of this kind, but even in these cities only a beginning has been made. The children pay for their lunches for the most part, but provision is also made for those who are unable to do so.

The other type is the hot midday lunch which is provided for children whose mothers are away from home, who live too far from school, or who for other reasons are unable to go home at noon. These lunches are being widely introduced thoughout the country. Special impetus has been given, the last few years, to the movement of supplying a hot noon meal for children of the rural schools also.

It can not be doubted that both types of lunch have been factors in improving the condition of children. It is true, however, that the school lunch has never done as much as it could and should do. Children, for the most part, choose their food unsupervised and thus too often have lunches inadequate in amount and unsuitable in kind, in spite of the fact that the school provides them. There is need that the school lunch should be recognized and used as one of the school's greatest opportunities for health instruction. Dr. Emerson has decided from his experience that a malnourished child can use food given in five small meals much better than if the same amount of food is given in three meals.

FRESH-AIR CLASSES OR SCHOOLS.

In the United States open-air rooms and schools have been employed for a number of years for tuberculous children, but of recent years they are being used for malnourished children to some extent. With nourishing food, fresh air, and physical and mental work suited to their condition, it is needless to say that the gain of these children in all respects is usually striking.

Dr. Newman [21] in 1917 expressed regret that provision for education under these open-air conditions had not increased more rapidly.

He urged strongly—what could be equally well recommended for the United States—that more of these schools be established for the malnourished children of Great Britain.

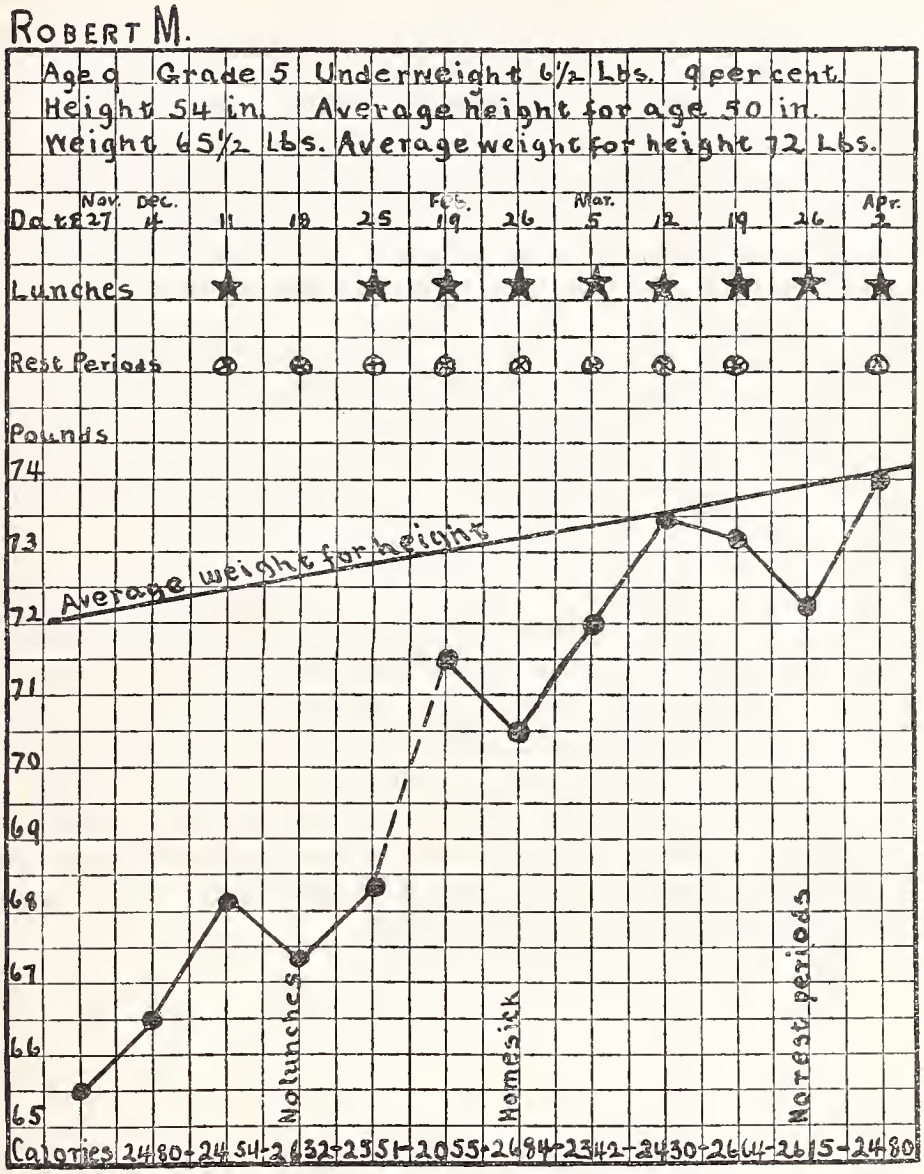
NUTRITION CLINICS AND CLASSES.

One of the most effective methods of dealing with undernutrition is the malnutrition clinic, or, as it is better called, the nutrition class. Dr. Emerson ㉒ as long ago as 1910 was conducting such a class in Boston, and more recently others ④ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ have been started in New York City, while scattering ones are reported in a few other cities. ㉙ Briefly, the conduct of a malnutrition class is as follows: ④ ㉚

Groups of underweight children meet weekly to be weighed, are examined by a physician, and given class instruction in food values and hygiene. Weight charts are kept (see p. 17), and the children compete to see which can gain most or be first to reach the normal weight lines. Any physical defects, such as diseased tonsils and adenoids, are always cared for first, as no gain can be expected until these causes are removed. Visits to the home to study home conditions and to engage the interest of the parents in carrying out the classroom instruction are a necessary and valuable part of the work. Mothers are urged to come to the class, but the instruction is given primarily to the children. The cooperation of the child is, in fact, the biggest factor in the success of the class. Once a boy becomes interested in his weight curve, he will drink milk, eat vegetables and oatmeal, go to bed earlier, open his windows, and take the necessary rest periods—things his parents may have been almost powerless to get him to do. The repeated health instructions, together with the weekly checking up and the spirit of class competition, combine to produce, on the whole, excellent results. Many of the children make almost startling gains and most of them gain at more than the expected rate.

There is general agreement that this type of work should be extended. Classes need not be confined to the dispensaries where they started, but may be conducted in schools, settlement houses, day nurseries—any place where children are gathered together. The school is the logical place for this health instruction. Here regularity of attendance can be easily secured; and the combined efforts of the medical service, hygiene classes, the physical training exercises, the domestic science department, and the school lunch, as well as the general school activities, can all be utilized to insure that all the children learn and, during the school day at least, practice healthful, hygienic living. Chicago has just started a city-wide campaign of this nature in its public schools. The field has been surveyed, scales for every building have been purchased, and the work is already begun in a few schools. It is to be hoped that this movement will soon be nation wide.

SPECIMEN CHART KEPT FOR EACH CHILD UNDER TREATMENT BY THE CLASS METHOD.[1]



Red star, represented by ★, means daily lunch; blue star, represented by ⊕, means daily rest period; gold star, represented by ●, means greatest gain in week. The weight curve is that of a child chosen because he was under constant observation day and night, together with 11 other children, all of whom lost weight on these same dates when lunches and rest periods were omitted the week preceding. On the original chart the weight curve is in red. Diagnosis of the cause of gain or loss in weight of children in the school group could be made by inference only, and therefore could not be verified.

[1] Prepared by Dr. Wm. R. P. Emerson and published in an article by him on "A nutrition clinic in a public school," in the American Journal of Diseases of Children, vol. 17 (April, 1919), p. 260.

CHILDREN'S YEAR CAMPAIGN.

The agencies already referred to have been concerned only with the child of school age. It is during the preschool period, however, that malnutrition usually starts. The Children's Bureau by this past year's campaign for children of preschool age has at last centered the attention of the country upon this "the neglected age." The program for Children's Year which the bureau outlined has been carried out by the local child welfare committees organized under the Child Conservation Section of the Council of National Defense. Through weighing and measuring tests and conferences on child welfare, an enormous number of children has been reached. Greater even than this work, however, will be that which States, cities, social organizations, physicians, and parents have been roused to do. Some cities have instituted a house-to-house canvass to examine children for malnutrition, diseased tonsils, adenoids, and other defects, and a movement to extend the work of infant-welfare centers to children of this group has already begun.

Adequate prenatal care is becoming more and more general; babies up to 2 years of age are for the most part looked after either by private physicians or infant-welfare societies. When all infant-welfare agencies assume responsibility for the preschool child; when all schools, through proper medical attention, health instruction, school lunches, and healthful schoolroom conditions, insure suitable care of the school child; then the ideal—continuous health supervision of children from conception through all the growing period—will come near to being realized. Then, and not till then, can we hope to solve the problem of the undernourished child.

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